

This listing of claims will replace all prior versions, and listings, of claims in the application:

1       Claim 1 (currently amended): A multiband data communication apparatus  
2       which receives signals by switching a plurality of frequency bands in response to a band  
3       switching signal, said multiband data communication apparatus comprising:  
4       quadrature demodulating means for converting either a reception signal or a reception  
5       intermediate frequency signal into a quadrature reception baseband signal, said  
6       quadrature demodulating means including:  
7            a pair of first quadrature mixers for converting either the reception signal or the  
8       reception intermediate frequency signal into a reception baseband signal;  
9            local oscillating means for producing a local oscillation signal; and  
10          phase shifting means for shifting a phase of said local oscillation signal based  
11       upon said band switching signal to thereby supply the phase-shifted local oscillation  
12       signal to one or both of said pair of first quadrature mixers.

1       Claim 2 (previously amended): A multiband data communication apparatus  
2       which transmits signals by switching a plurality of frequency band in response to a band  
3       switching signal, said multiband data communication apparatus comprising:  
4       quadrature modulating means for converting a quadrature transmission  
5       baseband signal into either a transmission signal or a transmission intermediate  
6       frequency signal, said quadrature modulating means including:  
7            a pair of second quadrature mixers for converting a transmission baseband signal  
8       into either the transmission signal or the transmission intermediate frequency signal;  
9            local oscillating means for producing a local oscillation signal; and  
10          phase shifting means for shifting a phase of said local oscillation signal based  
11       upon said band switching signal to thereby supply the phase-shifted local oscillation  
12       signal to one or both of said pair of second quadrature mixers.

1       Claim 3 (currently amended): A multiband data communication apparatus

2 comprising:

3       quadrature modulating means for converting a quadrature transmission  
4 baseband signal into either a transmission signal or a transmission intermediate  
5 frequency signal;

6       quadrature demodulating means for converting either a reception signal or a  
7 reception intermediate frequency signal into a quadrature reception baseband signal;  
8 and

9       local oscillation signal producing means for supplying a local oscillation signal to  
10 both said quadrature modulating means and said quadrature demodulating means, for  
11 transmitting/receiving by switching a plurality of frequency bands in response to a band  
12 switching signal,

13       wherein said quadrature demodulating means includes a pair of first quadrature  
14 mixers for converting either the reception signal or the reception intermediate frequency  
15 signal into a reception baseband signal; and wherein

16       said quadrature modulating means includes a pair of second quadrature mixers  
17 for converting a transmission baseband signal into either the transmission signal or the  
18 transmission intermediate frequency signal; and further wherein

19       said local oscillation signal producing means includes local oscillating means for  
20 producing a local oscillation signal, and said apparatus further comprises

21       phase shifting means for shifting a phase of said local oscillation signal based  
22 upon said band switching signal to thereby supply the phase-shifted local oscillation  
23 signal to one or both of said pair of first quadrature mixers and to one or both of said  
24 pair of second quadrature mixers.

1       Claim 4 (currently amended): A multiband data communication apparatus as  
2 claimed in claim 1, 2, or 3, wherein said phase shifting means supplies a signal obtained  
3 by shifting the phase of said local oscillation signal by  $\pi/2$  to one of said pair of first  
4 quadrature mixers and one of said pair of second quadrature mixers, while said phase  
5 shifting means supplies one of said local oscillation signal and a signal obtained by

6 inverting a code of said local oscillation signal to the other of said pair of first quadrature  
7 mixers and to the other of said pair of second quadrature mixers in response to said  
8 band switching signal.

1           Claim 5 (currently amended): A multiband data communication apparatus as  
2 claimed in claim 1, 2, or 3, wherein said phase shifting means supplies said local  
3 oscillation signal to one of said pair of first quadrature mixers and to one of said pair of  
4 second quadrature mixers; while said phase shifting means supplies one of a signal  
5 obtained by shifting the phase of said local oscillation signal by  $\pi/2$  and a signal  
6 obtained by shifting the phase of said local oscillation signal by  $\pi/2$  and by then inverting  
7 said phase-shifted local oscillation signal to the other mixer of said pair of first  
8 quadrature mixers and also to the other mixer of said pair of second quadrature mixers  
9 in response to said band switching signal.

1           Claim 6 (currently amended): A multiband data communication apparatus as[['']]  
2 claimed in claim 1, 2, or 3, wherein said phase shifting means supplies said local  
3 oscillation signal to one of said pair of first quadrature mixers and to one of said pair of  
4 second quadrature mixers, while said phase shifting means supplied supplies one of a  
5 signal obtained by delaying the phase of said local oscillation signal by  $\pi/2$  and a signal  
6 obtained by advancing the phase of said local oscillation signal by  $\pi/2$  to the other of  
7 said pair of first quadrature mixers and also to the other of said pair of second  
8 quadrature mixers in response to said band switching signal.

1           Claim 7 (currently amended): A multiband data communication apparatus which  
2 receives signals by switching a plurality of frequency bands in response to a band  
3 switching signal, said multiband data communication apparatus comprising:

4           quadrature demodulating means for converting either a reception signal or a  
5 reception intermediate frequency signal into quadrature reception baseband signal, said  
6 quadrature demodulating means including:

7 a pair of first quadrature mixers for converting either the reception signal or the  
8 reception intermediate frequency signal into a reception baseband signal;

9 storage means for saving thereinto discrete data ['] of a frequency pattern  
10 component functioning as a base;

11 address generating means for generating an address every preselected clock;

12 phase shift means for adding a predetermined number based upon said band  
13 switching signal to said address;

14 first analog converting means for analog-converting data which is read out by  
15 addressing said storage means based on the address outputted from said address  
16 generating means to thereby supply the analog-converted data to one of said pair of first  
17 quadrature mixers; and

18 second analog converting means for analog-converting data which is read out  
19 by addressing said storage means based on the output of said phase shift means to  
20 thereby supply the analog-converted data to the other of said pair of first quadrature  
21 mixers.

1 Claim 8 (currently amended): A multiband data communication apparatus which  
2 transmits signals by switching a plurality of frequency band in response to a band  
3 switching signal, said multiband data communication apparatus comprising:

4 quadrature modulating means for converting a quadrature transmission  
5 baseband signal into either a transmission signal or a transmission intermediate  
6 frequency signal, said quadrature modulating means including: [-.]

7 a pair of second quadrature mixers for converting a transmission baseband signal  
8 into either the transmission signal or the transmission intermediate frequency signal;

9 storage means for saving thereinto discrete data of a frequency pattern  
10 component functioning as a base address generating means for generating an address  
11 every preselected clock;

12 phase shift means for adding a predetermined number based upon said band  
13 switching signal to said address;

14        first analog converting means for analog-converting data which is read out by  
15        addressing said storage means based on the address outputted from said address  
16        generating means to thereby supply the analog-converted data to one of said pair of  
17        second quadrature mixers; and

18        second analog converting means for analog-converting data which is read out  
19        by addressing said storage means based[[,] on the output of said phase shift means  
20        to thereby supply the['] analog-converted data to the other of said pair of second  
21        quadrature mixers.

*Claim 9*  
2        Claim 9 (currently amended): A multiband data communication apparatus  
comprising:

3        quadrature modulating means for converting a quadrature transmission  
4        baseband signal into either a transmission signal or a transmission intermediate  
5        frequency signal;

6        quadrature demodulating means for converting either a reception signal or a  
7        reception intermediate frequency signal into a quadrature reception baseband signal;  
8        and

9        local signal producing means for supplying a local oscillation signal to both said  
10        quadrature modulating means and said quadrature demodulating means, for  
11        transmitting/receiving by switching a plurality of frequency bands in response to a band  
12        switching signal, wherein[:]

13        said quadrature demodulating means includes a pair of first quadrature mixers  
14        for converting either the[',] reception signal or the reception intermediate frequency  
15        signal into a reception baseband signal; and further wherein

16        said quadrature modulating means includes a pair of second quadrature mixers  
17        for converting a transmission baseband signal into either the transmission signal or the  
18        transmission intermediate frequency signal; and still further wherein

19        said local oscillation signal producing means includes storage means for saving  
20        thereinto discrete data of a frequency pattern component functioning as a base; address

21 generating means **Means** for generating an address every preselected clock; phase  
22 shift means for adding a predetermined[.] number based upon said band switching  
23 signal to said address; first analog converting means for analog-converting data which  
24 is read out by addressing['] said storage means based on the address outputted from  
25 said address generating means to thereby supply the analog-converted data to one of  
26 said pair of first quadrature mixers; and second analog converting means for analog-  
27 converting data which is read out by addressing said storage means based on the  
28 output of said phase shift means to thereby supply the analog-converted data to the  
29 other of said pair of first quadrature mixers.

1           Claim 10 (currently amended): A multiband data communication apparatus as  
2 claimed in claim 7, 8, or 9, wherein either said quadrature modulating means or said  
3 local oscillation signal producing means includes clock generating means for generating  
4 a clock signal[;] and interval determining means for determining a clock interval used  
5 to read out data from said storage means so as to control the address generating  
6 operation of said address generating means.

1           Claim 11 (currently amended): A communication method of a multiband data  
2 communication apparatus including quadrature demodulating means for converting  
3 either a reception signal or a reception intermediate frequency signal into a quadrature  
4 reception baseband signal, for receiving by switching a plurality of frequency bands in  
5 response to A a band switching signal, said communication method comprising the  
6 steps of:

7           producing a local oscillation signal; and  
8           shifting a phase of said local oscillation signal in response to said band switching  
9 signal to thereby supply the phase-shifted local oscillation signal to a first quadrature  
10 mixer for converting either the reception signal or the reception intermediate frequency  
11 signal into a reception baseband signal.

1       Claim 12 (currently amended): A communication method of a multiband data  
2 communication apparatus including quadrature modulating means for converting a  
3 quadrature transmission baseband signal into either a transmission signal or a  
4 transmission intermediate frequency signal, for transmitting by switching a plurality of  
5 frequency band in response to a band switching signal, said communication method  
6 comprising the steps of:

7           producing a local oscillation signal; and

8           shifting a phase of said local oscillation signal in response to said band switching  
9 signal to thereby supply the phase-shifted local oscillation signal to a second quadrature  
10 mixer for converting a transmission baseband signal into either the transmission signal  
11 or the transmission intermediate frequency signal.

1       Claim 13 (currently amended): A communication method of a multiband data  
2 communication apparatus including quadrature modulating means for converting a  
3 quadrature transmission baseband signal into either a transmission signal or a  
4 transmission intermediate frequency signal; and quadrature demodulating means for  
5 converting either a reception signal or a reception intermediate frequency signal into a  
6 quadrature reception baseband signal[[;]] which wherein said apparatus transmits and  
7 receives signals by switching a plurality of frequency bands in response to a band  
8 switching signal, said communication method comprising the steps of:

9           producing a local oscillation signal; and

10          shifting a phase of said local oscillation signal in response to the band switching  
11 signal to thereby supply the phase-shifted local oscillation signal to one or both of a first  
12 quadrature mixer and a second quadrature mixer, said first quadrature mixer converting  
13 either the reception signal or the reception intermediate frequency signal into a  
14 reception baseband signal, and said second quadrature mixer converting a transmission  
15 baseband signal into either the transmission signal or the transmission intermediate  
16 frequency signal.

1       Claim 14 (currently amended): A communication method of a multiband data  
2 communication apparatus as claimed in claim 11, 12, or 13, wherein said phase shifting  
3 step includes:

4           a first supplying step for supplying a signal which is obtained by shifting the  
5 phase of said local oscillation signal[[.]] by  $\pi/2$  to one of said first quadrature mixer and  
6 said second quadrature mixer;

7           an inverting step for inverting a code of said local oscillation signal; and

8           a second supplying step for supplying one of said local oscillation signal and the  
9 output signal of said inverting step to the other of said first quadrature mixer and said  
10 second quadrature mixer in response to said band switching signal.

1       Claim 15 (currently amended): A communication method of a multiband data  
2 communication apparatus as claimed in claim 11, 12, or 13, wherein said phase shifting  
3 step includes:

4           a first supplying step for supplying said local oscillation signal to one of said first  
5 quadrature mixer and said second quadrature mixer;

6           a phase shifting step for shifting the phase of said local oscillation signal by  $\pi/2$ ;

7           an inverting step for inverting a code of said output signal of said phase shifting  
8 step; and

9           a second supplying step for supplying one of said output signal of said phase  
10 shifting step and the output signal of said inverting step to the other of said first  
11 quadrature mixer and said second quadrature mixer in response to said band switching  
12 signal.

1       Claim 16 (currently amended): A communication method of a multiband data  
2 communication apparatus as claimed in claim 11, 12, or 13, wherein said phase shifting  
3 step includes:

4           a first supplying step for supplying said local oscillation signal to one of said first  
5 quadrature mixer and[[']] said second quadrature mixer;

6 a phase delaying step for delaying the phase of said local oscillation signal by  
7  $\pi/2$ ;

8 a phase advancing step for advancing the phase of said local oscillation signal  
9 by  $\pi/2$ ; and

10 a second supplying step for supplying one of the output signal of said phase  
11 delaying step and the output signal of said phase advancing step to the other of said  
12 first quadrature mixer and said second quadrature mixer in response to said band  
13 switching signal.

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Claim 17 (currently amended): A communication method of a multiband data  
communication apparatus including quadrature demodulating means for converting  
either a reception signal or a reception intermediate frequency signal into a quadrature  
reception baseband signal, for receiving by switching a plurality of frequency bands in  
response to a band switching signal, said communication method comprising:

6 a storing step for saving ~~thereinto~~ discrete data[[[,]]] of a frequency pattern  
7 component functioning as a base;

8 an address generating step for generating an address every preselected clock  
9 signal;

10 a phase shifting step for adding a predetermined number based upon said band  
11 switching signal to said address;

12 a first analog converting step for analog-converting[[',]] data which is read out by  
13 addressing said storing step based on the address outputted from said address  
14 generating step to thereby supply the analog-converted data to one of a pair of first  
15 quadrature mixers for converting either the reception signal or the reception  
16 intermediate frequency signal into a reception baseband signal; and

17 a second analog converting step for ~~analog-converting~~ analog-converting data  
18 which is read out by addressing said storing step based on the output of said phase  
19 shifting step to thereby supply the analog-converted data to the other of said first  
20 quadrature mixers.

1       Claim 18 (currently amended): A communication method of a multiband data  
2 communication apparatus including quadrature modulating means for converting a  
3 quadrature transmission baseband signal into either a transmission signal or a  
4 transmission intermediate frequency signal, for transmitting by switching a plurality of  
5 frequency band in response to a band switching signal, said communication method  
6 comprising:

7           a storing step for saving ~~thereinto~~ discrete data of a frequency pattern component  
8 functioning as a base;

9           an address generating step for generating an address every preselected clock  
10 ~~signal~~;

11           a phase shifting step for adding a predetermined number based upon said band  
12 switching signal to said address;

13           a first analog converting step for analog-converting data which is read out by  
14 addressing said storing step based on the address outputted from said address  
15 generating step to thereby supply the analog-converted data to one of a pair of second  
16 quadrature mixers for converting a transmission baseband signal into either the  
17 transmission signal or the transmission intermediate frequency signal; and

18           a second analog converting step for analog-converting data which is read out by  
19 addressing said storing step based on the output of said phase shifting step to thereby  
20 supply the analog-converted data to the other of said second quadrature mixers.

1       Claim 19 (currently amended): A communication method of a multiband data  
2 communication apparatus including quadrature modulating means for converting a  
3 quadrature transmission baseband signal into either a transmission signal or a  
4 transmission intermediate frequency signal; and quadrature demodulating means for  
5 converting either a reception signal or a reception intermediate frequency signal into a  
6 quadrature reception baseband signal; and for transmitting/receiving by switching a  
7 plurality of frequency bands in response to a band switching signal, said communication

8 method comprising:

9 a storing step for saving thereinto discrete data of a frequency pattern component  
10 functioning as a base;

11 an address generating step for generating an address every preselected clock  
12 signal;

13 a phase shifting step for adding a predetermined number based upon said band  
14 switching signal to said address;

15 a first analog converting step for analog-converting data which is read out by  
16 addressing said storing step based on[[']] the address outputted from said address  
17 generating step to thereby supply the analog-converted data to one of a first quadrature  
18 mixer and a second quadrature mixer, said first quadrature mixer converting either the  
19 reception signal or the reception intermediate frequency signal into a reception  
20 baseband signal, and [[a]] said second quadrature mixer converting a transmission  
21 baseband signal into either the transmission signal or the transmission intermediate  
22 frequency signal; and

23 a second analog converting step for analog-converting data which is read out by  
24 addressing said storing step based on the output of said phase shifting step to thereby  
25 supply the analog-converted data to the other of said first quadrature mixer and said  
26 second quadrature mixer.

1 Claim 20 (original): A storage medium for storing thereinto a computer readable  
2 program used to execute the communication method of the multiband data  
3 communication apparatus as recited in claim 11, 12, 13, 14, 15, 16, 17, 18, or 19.

1 Claim 21 (currently amended): A multiband data communication apparatus  
2 which receives signals by switching a plurality of frequency bands in response to a band  
3 switching signal, said multiband data communication apparatus comprising:

4 quadrature demodulating means for converting either a reception signal or a  
5 reception intermediate frequency signal into a quadrature reception baseband signal,

6 said quadrature demodulating means including:

7 a pair of first quadrature mixers for converting either the reception signal or the  
8 reception intermediate frequency signal into a reception baseband signal;

9 local oscillating means for producing a local oscillation signal;

10 phase shifting means for shifting a phase of said local oscillation signal for input  
11 to one of said pair of first quadrature ~~mixers~~ mixers; and

12 means for optionally changing a phase of said local oscillation signal for input to  
13 another of said pair of first quadrature mixers based upon said band switching signal to  
14 thereby ensure correct polarities of quadrature components of said reception baseband  
15 signal.

1 Claim 22 (previously added): A multiband data communication apparatus  
2 which receives signals by switching a plurality of frequency bands in response to a band  
3 switching signal, said multiband data communication apparatus comprising:

4 quadrature demodulating means for converting either a reception signal or a  
5 reception intermediate frequency signal into a quadrature reception baseband signal,  
6 said quadrature demodulating means including:

7 a pair of first quadrature mixers for converting either the reception signal or the  
8 reception intermediate frequency signal into a reception baseband signal;

9 local oscillating means for producing a local oscillation signal; and

10 phase shifting means for shifting a phase of said local oscillation signal to ensure  
11 consistent polarities of quadrature components of said reception baseband signal  
12 irrespective of an operating band of the apparatus.

1 Claim 23 (new): A multiband data communication apparatus as claimed in claim 1,  
2 wherein said phase shifting means supplies a signal obtained by shifting the phase of  
3 said local oscillation signal by  $\pi/2$  to one of said pair of first quadrature mixers, while  
4 said phase shifting means supplies one of said local oscillation signal and a signal  
5 obtained by inverting a code of said local oscillation signal to the other of said pair of

6 first quadrature mixers in response to said band switching signal.

1           Claim 24 (new): A multiband data communication apparatus as claimed in claim  
2, wherein said phase shifting means supplies said local oscillation signal to one of said  
3 pair of first quadrature mixers while said phase shifting means supplies one of a signal  
4 obtained by shifting the phase of said local oscillation signal by  $\pi/2$  and a signal  
5 obtained by shifting the phase of said local oscillation signal by  $\pi/2$  and then inverting  
6 said phase-shifted local oscillation signal to the other mixer of said pair of first  
7 quadrature mixers in response to said band switching signal.

1           Claim 25 (new): A multiband data communication apparatus as claimed in claim  
2, wherein said phase shifting means supplies said local oscillation signal to one of said  
3 pair of first quadrature mixers, while said phase shifting means supplies one of a signal  
4 obtained by delaying the phase of said local oscillation signal by  $\pi/2$  and a signal  
5 obtained by advancing the phase of said local oscillation signal by  $\pi/2$  to the other of  
6 said pair of first quadrature mixers in response to said band switching signal.

1           Claim 26 (new): A multiband data communication apparatus as claimed in claim 2,  
2 wherein said phase shifting means supplies a signal obtained by shifting the phase of  
3 said local oscillation signal by  $\pi/2$  to one of said pair of second quadrature mixers, while  
4 said phase shifting means supplies one of said local oscillation signal and a signal  
5 obtained by inverting a code of said local oscillation signal to the other of said pair of  
6 second quadrature mixers in response to said band switching signal.

1           Claim 27 (new): A multiband data communication apparatus as claimed in claim  
2, wherein said phase shifting means supplies said local oscillation signal to one of said  
3 pair of second quadrature mixers while said phase shifting means supplies one of a  
4 signal obtained by shifting the phase of said local oscillation signal by  $\pi/2$  and a signal

5 obtained by shifting the phase of said local oscillation signal by  $\pi/2$  and then inverting  
6 said phase-shifted local oscillation signal to the other mixer of said pair of second  
7 quadrature mixers in response to said band switching signal.

1           Claim 28 (new): A multiband data communication apparatus as claimed in claim  
2, wherein said phase shifting means supplies said local oscillation signal to one of said  
3 pair of second quadrature mixers, while said phase shifting means supplies one of a  
4 signal obtained by delaying the phase of said local oscillation signal by  $\pi/2$  and a signal  
5 obtained by advancing the phase of said local oscillation signal by  $\pi/2$  to the other of  
6 said pair of second quadrature mixers in response to said band switching signal.

1           Claim 29 (new): A multiband data communication apparatus as claimed in claim  
2, wherein either said quadrature modulating means includes clock generating means  
3 for generating a clock signal and interval determining means for determining a clock  
4 interval used to read out data from said storage means so as to control the address  
5 generating operation of said address generating means.

1           Claim 30 (new): A multiband data communication apparatus as claimed in claim  
2, wherein either said quadrature modulating means includes clock generating means  
3 for generating a clock signal and interval determining means for determining a clock  
4 interval used to read out data from said storage means so as to control the address  
5 generating operation of said address generating means.